



UNITED STATES PATENT AND TRADEMARK OFFICE

MN

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/726,269	12/01/2003	Murali Basavaiah	ANDIP037	3368
22434	7590	07/16/2007		
BEYER WEAVER LLP			EXAMINER	
P.O. BOX 70250			UNELUS, ERNEST	
OAKLAND, CA 94612-0250				
			ART UNIT	PAPER NUMBER
			2181	
			MAIL DATE	DELIVERY MODE
			07/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/726,269

Applicant(s)

BASAVAIAH ET AL.

Examiner

Ernest Unelus

Art Unit

2181

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

RESPONSE TO AMENDMENT

Claim rejections based on prior art

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn.

Applicant's arguments with respect to claims 1-23 have been considered but are moot in view of the new ground(s) of rejection

INFORMATION CONCERNING OATH/DECLARATION

Oath/Declaration

2. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in 37 C.F.R. 1.63.

INFORMATION CONCERNING DRAWINGS

Drawings

3. The applicant's drawings submitted are acceptable for examination purposes.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 1-23**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullendore et al. (US 2003/0185154) in view of Beukema et al. (US pat. 6,978,300).

6. As per **claim 1**, Mullendore discloses “an apparatus, comprising: a Switch (150), the Switch including:

a port (paragraph 0027 discloses “the switch device typically includes a processor, a buffer, a first port for coupling to a low speed or TCP/IP based network link”) configured to receive a write command frame (write 16MB) defining an initiating Host (initiator 135) and a target (target 145) (see fig. 4 and paragraph 0054);

a trapping mechanism (paragraph 0046 discloses the buffer held the command within the switch) configured to trap the write command frame if the write command frame designates a predetermined Host_ID (the initiator, 135, ID) and a predetermined target_ID (the target, 145, ID) (each command within a fibre channel protocol discloses the sender and the target identity, as discloses in paragraph 0054); and

a processor (the processor within the switch, as discloses in paragraph 0027) configured to process the trapped write commands (see paragraphs 0029 and 0061, which discloses the processor within the switch is able partially transfer the write command).

but fails to disclose expressly a frame having a header with an OX_ID or RX_ID and modifying either the OX_ID or RX_ID of the write command header.

Paragraph 0018 of the applicant's specification discloses "As previously noted, the OX_ID field 32 and the RX_ID field 34 are each 16 bits wide and are used for identifying the originating Host and target device".

Similarly, Beukema discloses a data packet 712 of fig. 7 having routing header 716 and transport header 718, which are use to identify a source and a destination target; in the same way that a RX_ID is used to specifies a target. See col. 10, lines 58-65. In other words, OX-ID and RX_ID are being interpreted as addresses for a source and a destination. In regards to *modifying either the OX_ID or RX_ID of the write command header*, in col. 10, lines 49-50, Beukema discloses "Routers, also modify the packet's network header when the packet crosses a subnet boundary". Col. 11, lines 36-38 discloses, "The network header includes routing information, such as the destination IP address and other network routing information".

Mullendore et al. (US 2003/0185154) and Beukema et al. (US pat. 6,978,300) are analogous art because they are from the same field of endeavor of packet switching in a wide area network (WAN) and/or local area network (LAN).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify a congestion management systems and methods are provided to overcome head-of-line blocking issues resulting from slower-speed network links, such as low speed WAN links or links using a TCP/IP based storage protocol as described by Mullendore and a mechanism by which modifications to components of the network fabric may be made without tearing down existing connections as taught by Beukema.

The motivation for doing so would have been because Beukema teaches, **“The method and apparatus provide a mechanism by which modifications to components of the network fabric may be made without tearing down existing connections. The apparatus and method facilitate such fabric management by placing send queues in a send queue drain state and suspending the send queues affected by changes to the network fabric while the modifications are being made. Once the modifications are complete, the send queues are place back into an operational state”** (see col. 2, lines 31-38).

Therefore, it would have been obvious to combine Beukema et al. (US pat. 6,978,300) with Mullendore et al. (US 2003/0185154) for the benefit of creating the apparatus to obtain the invention as specified in claim 1.

7. As per **claim 2**, the combination of Mullendore and Beukema discloses “the apparatus of claim 1” [See rejection to claim 1 above], Mullendore further discloses, “wherein the Switch (150) is an initiating Switch coupled to the Host (135) in a first SAN (165) (see fig. 4).

8. As per **claim 3**, the combination of Mullendore and Beukema discloses “the apparatus of claim 2” [See rejection to claim 2 above], “wherein the processor of the initiating Switch (165) is further configured to modify the write command before forwarding the write command to the target (145) (paragraphs 0029 and 0061 of Mullendore, discloses the processor within the switch, and paragraph 0077 discloses the switch being a router. Col. 10, lines 49-50, of Beukema discloses “Routers, also modify the packet's network header when the packet crosses a subnet boundary”).

9. As per **claims 4, 8, and 15**, the combination of Mullendore and Beukema discloses “the apparatus of claim 3” [See rejection to claim 3 above], “wherein the initiating Switch (150) is further configured to modify the write command (write 16MB) by modifying the OX_ID value for the write command before forwarding the write command to the target (Paragraph 0018 of the applicant’s specification discloses “As previously noted, the OX_ID field 32 and the RX_ID field 34 are each 16 bits wide and are used for identifying the originating Host and target device”. Similarly, Beukema discloses a data packet 712 of fig. 7 having routing header 716 and transport header 718, which are use to identify a source and a destination target; in the same way that a RX_ID is used to specifies a target. See col. 10, lines 58-65. In other words, OX-ID and RX_ID are being interpreted as addresses for a source and a destination. In regards to *modifying either the OX_ID or RX_ID of the write command header*, in col. 10, lines 49-50, Beukema discloses “Routers, also modify the packet's network header when the packet crosses a subnet boundary”. Col. 11, lines 36-38 discloses, “The network header includes routing information, such as the destination IP address and other network routing information”).

10. As per **claim 5**, the combination of Mullendore and Beukema discloses “the apparatus of claim 4” [See rejection to claim 4 above], “wherein the initiating Switch (150) uses the initialized RX_ID value as a handle for accessing information pertaining to the write command session in a sessions ID table (see claim 4 above and col. 14, lines 6-20 of Beukema).

11. As per **claim 6**, the combination of Mullendore and Beukema discloses “the apparatus of claim 4” [See rejection to claim 4 above], Mullendore discloses “wherein the processor of the

initiating Switch (135) is further configured to issue a Transfer Ready command (**XFER_RDY 256KB**) to the Host (135) (see **fig. 4**).

12. As per **claim 7**, the combination of Mullendore and Beukema discloses “the apparatus of claim 5” [See **rejection to claim 5 above**], “wherein the initiating Switch (150) is further configured to initialize and use the initialized RX_ID value for all communication related to the write frame (16MB) between the initiating Switch (150) and the Host (135) (see **paragraph 0061 and fig. 4 of Mullendore and 10, lines 49-65 of Beukema**).

13. As per **claim 9**, the combination of Mullendore and Beukema discloses “the apparatus of claim 2” [See **rejection to claim 2 above**], Mullendore discloses, “wherein the initiating Switch (150) is further configured to transfer additional data frames (256KB) (**paragraph 0061 discloses that the switch separate the command into smaller portions and send those portions (256KB) separately to the target**) to the target (145) when the initiating Switch (150) receives a Transfer Ready command (**XFER_RDY 256KB**) associated with the write frame (**write 16MB**) from the target (see **fig. 4**).

14. As per **claim 10**, the combination of Mullendore and Beukema discloses “the apparatus of claim 1” [See **rejection to claim 1 above**], Mullendore discloses, “wherein the Switch (140) is a target Switch coupled to the target (145) (see **fig. 4**).

15. As per **claim 11**, the combination of Mullendore and Beukema discloses “the apparatus of claim 10” [See **rejection to claim 10 above**], Mullendore discloses, “wherein the target Switch (140) forwards the write command (16MB) to the target (145) (see **fig. 4**).

16. As per **claim 12**, the combination of Mullendore and Beukema discloses “the apparatus of claim 10” [See rejection to claim 10 above], Mullendore discloses, “wherein the target Switch (140) forwards data frames (128KB) associated with the write command (16MB) to the target (145) after receiving a Transfer Ready command (XFER_RDY 128KB) from the target (145) (see fig. 4).

17. As per **claim 13**, the combination of Mullendore and Beukema discloses “the apparatus of claim 12” [See rejection to claim 12 above], Mullendore discloses, “wherein the target Switch (140) is further configured to buffer the data frames (128KB) prior to receipt of the Transfer Ready command (XFER_RDY 128KB) see paragraph 0061 and fig. 4.

18. As per **claim 14**, the combination of Mullendore and Beukema discloses “the apparatus of claim 12” [See rejection to claim 12 above], “wherein target Switch (140) is further configured to maintain (the buffer inside the switch having a identified data) a sessions ID table and to use the OX_ID of the write command as an index to the session corresponding to the write command (see paragraphs 0054 and 0061 of Mullendore and col. 14, lines 6-20 of Beukema).

19. As per **claim 16**, the combination of Mullendore and Beukema discloses “the apparatus of claim 5” [See rejection to claim 5 above], wherein the target Switch (140) is further configured to modify the OX_ID value with communications between the target Switch (140) and the target (145) (see paragraphs 0029 and 0061 of Mullendore and col. 10, lines 58-65 and Col. 11, lines 36-38 of Beukema).

20. As per **claim 17**, the combination of Mullendore and Beukema discloses “the apparatus of claim 1” [See rejection to claim 1 above], wherein the Switch is further configured to use the RX_ID value of trapped write commands to specify the amount of buffer space needed for the write command and use the write command frame to request the needed buffer space (see **paragraph 0061 of Mullendore and fig. 7 of Beukema**).

21. As per **claim 18**, the combination of Mullendore and Beukema discloses “the apparatus of claim 17” [See rejection to claim 17 above], wherein the Switch (150) is further configured to use the RX_ID value of trapped write commands (**write 16MB**) to specify the amount of buffer space larger than needed for the write command and use the additional buffer space for subsequent write commands so that the Switch need not wait for a Transfer Ready command to transfer data related to the subsequent write command (see **paragraph 0061 and col. 10, lines 58-65 and Col. 11, lines 36-38 of Beukema**).

22. As per **claim 19**, the combination of Mullendore and Beukema discloses “the apparatus of claim 1” [See rejection to claim 1 above], Mullendore discloses, “wherein the Switch (150) is further configured to, in the event the Switch does not have sufficient buffer space for the write command (**write 16MB**) (see **paragraph 0064**), to either: (i) generate a busy status signal to the initiating Host; (ii) placing the write command on a pending wait list (**paragraph 0064 discloses, “then switch 150 holds the RTT message until buffer resources become sufficient to receive the entire write data specified by the RTT message ”**) ; or (iii) forwarding the write command to the target (see **paragraph 0070**).

23. As per **claim 20**, the combination of Mullendore and Beukema discloses “the apparatus of claim 1” [See rejection to claim 1 above], Mullendore discloses, “wherein a first SAN (360) including the Switch (switch A or B); a second SAN (365) including a second Switch (switch C or D); and an inter-SAN network (310) connecting the first SAN and the second SAN (see fig. 13).

24. As per **claim 21**, Mullendore discloses “a method comprising: trapping write commands (write 16MB) specifying a predesignated Host ID corresponding to a Host and target ID corresponding to a target at a Switch (150) as discloses by the applicant in paragraph 0026, a command’s address identify where it’s coming from and where it’s going. Similarly, see paragraph 0054 of Mullendore); configuring the Switch to forward the write command to the target (see paragraph 0061); configuring the Switch to initialize the write command (paragraphs 0029 and 0061 discloses the processor within the switch is able partially transfer the write command, which is to initialize it; and configuring the Switch to generate a Transfer Ready command value (XFER_RDY 256KB) to the Host (135) as a proxy for the target (145) (see fig. 4 and paragraph 0061).

but fails to disclose expressly a frame having a header with an OX_ID or RX_ID and modifying either the OX_ID or RX_ID of the write command header.

Paragraph 0018 of the applicant’s specification discloses “As previously noted, the OX_ID field 32 and the RX_ID field 34 are each 16 bits wide and are used for identifying the originating Host and target device”.

Similarly, Beukema discloses a data packet 712 of fig. 7 having routing header 716 and transport header 718, which are use to identify a source and a destination target; in the

Art Unit: 2181

same way that a RX_ID is used to specifies a target. See col. 10, lines 58-65. In other words, OX-ID and RX_ID are being interpreted as addresses for a source and a destination. In regards to *modifying either the OX_ID or RX_ID of the write command header*, in col. 10, lines 49-50, Beukema discloses “Routers, also modify the packet's network header when the packet crosses a subnet boundary”. Col. 11, lines 36-38 discloses, “The network header includes routing information, such as the destination IP address and other network routing information”.

Mullendore et al. (US 2003/0185154) and Beukema et al. (US pat. 6,978,300) are analogous art because they are from the same field of endeavor of packet switching in a wide area network (WAN) and/or local area network (LAN).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify a congestion management systems and methods are provided to overcome head-of-line blocking issues resulting from slower-speed network links, such as low speed WAN links or links using a TCP/IP based storage protocol as described by Mullendore and a mechanism by which modifications to components of the network fabric may be made without tearing down existing connections as taught by Beukema.

The motivation for doing so would have been because Beukema teaches, “**The method and apparatus provide a mechanism by which modifications to components of the network fabric may be made without tearing down existing connections. The apparatus and method facilitate such fabric management by placing send queues in a send queue drain state and suspending the send queues affected by changes to the network fabric while the**

modifications are being made. Once the modifications are complete, the send queues are place back into an operational state” (see col. 2, lines 31-38).

Therefore, it would have been obvious to combine Beukema et al. (US pat. 6,978,300) with Mullendore et al. (US 2003/0185154) for the benefit of creating the apparatus to obtain the invention as specified in claim 21.

25. As per **claim 22**, the combination of Mullendore and Beukema discloses “the method of claim 21” [See rejection to claim 21 above], Mullendore further discloses comprising configuring the Switch (140) to forward data frames (**data 128KB**) associated with the write command (**write 16MB**) received in response to the Transfer Ready command (**XFER_RDY 256KB**) to the target (145) (see fig. 4).

26. As per **claim 23**, the combination of Mullendore and Beukema discloses “the method of claim 22” [See rejection to claim 23 above], Mullendore further discloses receiving the write command (**write 16MB**) forwarded to the target (145) by the Switch (150) at a second Switch (140); configuring the second Switch (140) to forward the write command to the target (see fig. 4); and either: buffering the data frames forwarded to the target by the Switch until a Transfer Ready command is received from the target (see paragraph 0064); or forwarding the data frames (**data 128KB**) from the Switch (140) to the target (145) if the Transfer Ready command (**XFER_RDY 128KB**) has already been received from the Host (140) (see fig. 4).

RELEVANT ART CITED BY THE EXAMINER

27. The following prior art made of record and not relied upon is cited to establish the level of skill in the applicant's art and those arts considered reasonably pertinent to applicant's disclosure. See **MPEP 707.05(c)**.

A great example of a switch in a SAN using Fibre Channel header to modifying a Receiver Exchange Identifier (responder identifier) is clearly shown by "Fibre Channel – Fabric Generic Requirements (FC-FG)"; see section 5.3 on page 13.

CLOSING COMMENTS

Conclusion

a. STATUS OF CLAIMS IN THE APPLICATION

28. The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

a(1) CLAIMS REJECTED IN THE APPLICATION

29. Per the instant office action, claims 1-23 have received a final action on the merits.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

Art Unit: 2181

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

b. DIRECTION OF FUTURE CORRESPONDENCES

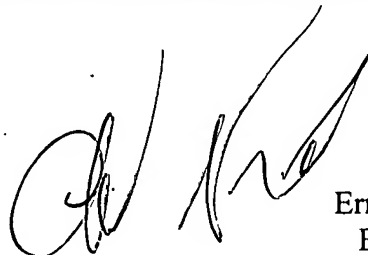
30. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ernest Unelus whose telephone number is (571) 272-8596. The examiner can normally be reached on Monday to Friday 9:00 AM to 5:00 PM.

IMPORTANT NOTE

31. If attempts to reach the above noted Examiner by telephone is unsuccessful, the Examiner's supervisor, Mr. Alford Kindred, can be reached at the following telephone number:
Area Code (571) 272-4037.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

June 29, 2007



**ALFORD KINDRED
PRIMARY EXAMINER**

Ernest Unelus
Examiner,
Art Unit 2181